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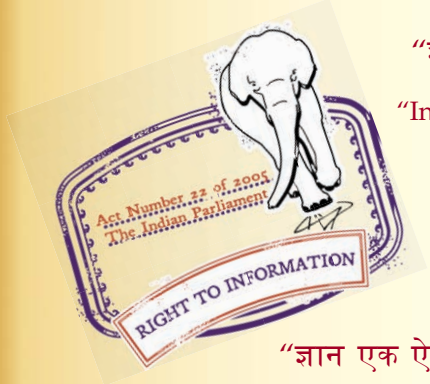
IS 5270 (1969): Rubber Grommets for General Purposes [PCD 13: Rubber and Rubber Products]



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IS : 5270 - 1969
(Reaffirmed 2012)

Indian Standard

SPECIFICATION FOR RUBBER GROMMETS FOR GENERAL PURPOSES

(Second Reprint JULY 1984)

UDC 621-762.44

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 3 *December* 1969

Indian Standard

SPECIFICATION FOR RUBBER GROMMETS FOR GENERAL PURPOSES

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Indian Standard

SPECIFICATION FOR RUBBER GROMMETS FOR GENERAL PURPOSES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 6 June 1969, after the draft finalized by the Rubber Products Sectional Committee had been approved by the Chemical Division Council.

0.2 This standard covers non-oil-resistant grommets for general purposes for use in industries, such as automobile, electrotechnical and mechanical engineering, and has been prepared in response to the request from Heavy Electricals (India) Ltd, Bhopal.

0.3 The grommets specified in this standard can be manufactured from natural as well as synthetic rubbers. Attempts have been made to lay down physical requirements only. Additional test given in Appendix A for judging resistance of grommets to exposure cracking has been devised only as a guide for the detection of material which might give trouble in service.

0.4 This standard contains Table 1 and clauses **4.7**, **5.1**, **8.1**, **8.9** and **B-2.2.1** which call for agreement between the purchaser and the supplier.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for three types of grommets for general purposes.

*Rules for rounding off numerical values (*revised*).

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Blind Grommet — A grommet without a central hole.

2.2 Grommet — A circular resilient moulding with or without a central hole and having two flanges and a groove, the groove being for location and fixing purposes.

3. TYPES

3.1 This standard prescribes three types of grommets as follows:

a) *Type 1 Soft* — having International Rubber Hardness Degrees (IRHD) of 35 to 50,

b) *Type 2 Medium* — having International Rubber Hardness Degrees (IRHD) of 51 to 65, and

c) *Type 3 Hard* — having International Rubber Hardness Degrees (IRHD) of 66 to 75.

4. REQUIREMENTS

4.1 Materials — The grommets shall be made from natural or synthetic rubbers or a mixture of both.

4.2 Dimensions and Tolerances — The grommets shall conform to the nominal dimensions and tolerances within the limits specified in Table 1.

4.3 Concentricity — For sizes of *A* up to and including 12·5 mm, *B* in relation with *A* shall be concentric within 0·2 mm. For sizes of *A* 14·3 mm and above, *B* in relation with *A* shall be concentric within 0·5 mm.

4.4 Shape — The grommet shall conform to the shape shown in figure in Table 1.

4.5 Finish — All flashes and spew shall be removed by the manufacturer.

4.6 Physical Requirements — The material shall comply with the requirements given in Table 2.

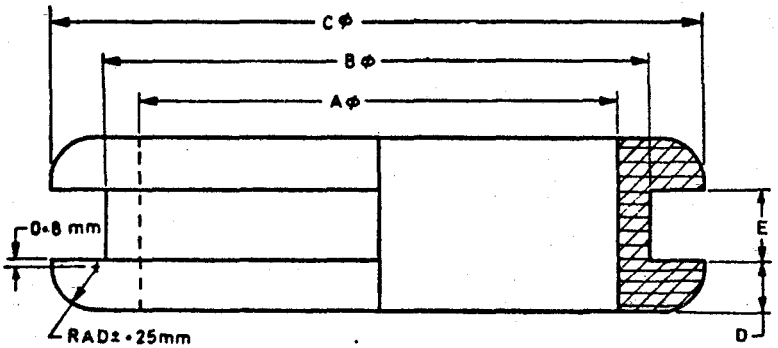
4.6.1 *Change in Physical Properties After Ageing* — The physical properties of rubber, specified in Table 2 for all three types of grommets, when subjected to ageing at 70° ± 1°C for 168 hours (*see* **8.7**) in an air-oven shall not vary by more than the limits prescribed in Table 3.

4.6.2 The grommets when subjected to ageing at 70° ± 1°C for 168 hours in an air-oven shall not show tackiness, cracking or other visible defects.

TABLE 1 DIMENSIONS AND TOLERANCES FOR GROMMETS

(*Clause* 4.2)

All dimensions in millimetres.



A		*B*		*C*		*D*		*E*	
Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
3·0		6·3		9·5		2·4		Anyone of the following as specified by the purchaser 1, 1·6, 1·9, 2·7, 3·0, 3·9, 5·0 or 6·3	+ 0·5 − 0·0 for all sizes
4·7		8·0		11·0		2·4			
6·3		9·5		12·5		2·4			
8·0		11·0		16·0		3·0			
9·5	+ 0·0	12·5	+ 0·5	17·5		3·0			
11·0	− 0·5	16·0	− 0·0	20·6		3·0			
12·5		17·5		22·2		3·0			
14·3		19·0		25·4		3·0			
16·0		20·6		27·0	+ 0·5	3·0	+ 0·5		
17·5		23·8		30·0	− 0·0	3·0	− 0·0		
19·0		25·4		31·7	for all	3·0	for all		
22·0		28·4		36·5	sizes	4·0	sizes		
25·4		31·7		39·7		4·0			
28·4		35·0		43·0		4·0			
31·7	+ 0·0	38·0	+ 1·0	46·0		4·0			
35·0	− 1·0	41·2	− 0·0	49·2		4·0			
38·0		44·4		53·8		4·7			
44·4		50·8		60·3		4·7			
50·8		57·0		66·6		4·7			
76·0		81·2		91·2		3·0			

NOTE — The dimensions *A* and *E* shall be clearly specified by the purchaser at the time of purchase.

TABLE 2 PHYSICAL REQUIREMENTS OF RUBBER BEFORE AGEING

(*Clause* 4.6)

Sl No.	Characteristic	Requirement		
		Type 1	Type 2	Type 3
(1)	(2)	(3)	(4)	(5)
i)	Hardness, IRHD*	35 to 50	51 to 65	66 to 75
ii)	Tensile strength, kgf/cm², *Min*	140	105	70
iii)	Elongation at break, percent, *Max*	500	350	200
iv)	Tension set, percent, *Max*	20	25	30
v)	Compression set at constant strain at 70° ± 1°C, percent, *Min*	25	25	•25

*International Rubber Hardness Degrees.

TABLE 3 CHANGES IN PHYSICAL PROPERTIES OF RUBBER AFTER AGEING

(*Clause* 4.6.1)

Sl No.	Characteristic	Permissible Variation from the Values Given in Table 2
(1)	(2)	(3)
i)	Hardness, IRHD*	± 5 from the initial hardness
ii)	Tensile Strength, percent	+ 10 − 25
iii)	Elongation at break, percent	+ 10 − 20

*International Rubber Hardness Degrees.

4.7 Optional Requirements

4.7.0 The requirements specified in **4.1** to **4.6** meet general requirements for most grommets but when additional tests are required they shall be clearly stated by the purchaser while placing order for the material. The optional requirements are given in **4.7.1** to **4.7.3**.

4.7.1 *Silver Staining* — The material shall show no sign of staining when tested in accordance with the method prescribed in **A-1**.

4.7.2 *Swelling* — When tested according to **8.9**, the change in volume after immersion in test liquid shall not exceed the limit stipulated by the purchaser.

4.7.3 *Exposure Cracking* — The material shall show no visible signs of cracking when subjected to exposure test given in **A-2**.

5. PACKING

5.1 The material shall be packed individually in polyethylene bags or as agreed to between the purchaser and the supplier.

6. MARKING

6.1 Each packing and where possible each grommet also, shall be marked with the following details:

a) Manufacturer's name or trade-mark, if any;

b) Type and dimensions A and E, for example, 3/1 (*see* Figure in Table 1); and

c) Month and year of manufacture, if required by the purchaser.

6.1.1 Each grommet may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

7. SAMPLING

7.1 Scale of Sampling and Criteria for Conformity — For the purpose of ascertaining the conformity of rubber grommets in a consignment to this specification, the scale of sampling and criteria for conformity shall be as prescribed in Appendix B.

8. TEST METHODS

8.1 Unless otherwise agreed to between the purchaser and the supplier, carry out tests within three months from the date of receipt of the material by the purchaser.

8.2 Where it is not possible to carry out tests on finished product, test shall be done on pieces from a 5 mm thick test slab, cured to the same degree under identical conditions as that of the grommets.

NOTE — This test slab shall be provided by the manufacturer.

8.3 Hardness — Test the hardness of rubber in accordance with the method prescribed in IS : 3400 (Part II)-1965*.

8.4 Tensile Strength and Elongation at Break — Test the tensile strength and elongation at break in accordance with the method prescribed in IS : 3400 (Part I)-1965†.

8.5 Tension Set — Carry out the test in accordance with the method prescribed in IS : 3400 (Part XIII) - 1972‡ at the following elongations:

	Elongation, percent
Type 1	300
Type 2	200
Type 3	100

8.6 Compression Set — Carry out the test in accordance with the method prescribed in IS : 3400 (Part X)-1969§ at constant strain at 70° ± 1°C.

8.7 Accelerated Ageing — For carrying out all tests specified in Table 3 and **4.6.2**, age the test pieces or samples in accordance with the method prescribed in IS : 3400 (Part IV)-1965‖, in an air-oven at 70° ± 1°C for 168 hours.

8.8 Silver Staining — Test the material in accordance with the method prescribed in **A-1**.

8.9 Swelling — Test the material in accordance with the method prescribed in IS : 3400 (Part VI)-1965¶. The swelling liquid, time and temperature shall be previously agreed upon, depending upon the service conditions, between the purchaser and the supplier.

8.10 Exposure Cracking — Test the material in accordance with the method prescribed in **A-2**.

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*Methods of test for vulcanized rubbers: Part II Hardness.

†Methods of test for vulcanized rubbers: Part I Tensile stress-strain properties.

‡Methods of test for vulcanized rubbers: Part XIII Tension set

§Methods of test for vulcanized rubbers: Part X Compression set on constant strain.

‖Methods of test for vulcanized rubbers: Part IV Accelerated ageing.

¶Methods of test for vulcanized rubbers: Part VI Resistance to liquids.

APPENDIX A

(*Clauses* 0.3, 8.8 *and* 8.10)

TEST METHODS FOR OPTIONAL REQUIREMENTS

A-1. SILVER STAINING TEST

A-1.1 Test Plate — The silver plate shall be of assay quality or if silver-plated material is used, the thickness of plating shall be not less than 0·01 mm.

A-1.2 Procedure — Polish a test strip of silver with jeweller's rouge and water. Wipe with a clean rag which has been dipped in a degreasing solvent and finally wipe dry with a clean soft cloth. Place the grommet flat on the piece of silver or silver-plated plate and place in an oven at 70° ± 1°C for half an hour.

A-1.3 Result — At the end of this period there shall be no visible signs of staining.

A-2. TEST FOR RESISTANCE TO EXPOSURE CRACKING

A-2.0 This test may easily be carried out by the manufacturers themselves and has been devised as a guide for the detection of material which might give trouble in service. However, outdoor condition may vary from place to place.

A-2.1 Procedure — Deform the grommet so that the opposite ends of internal diameter meet at the middle. Tie the grommet in this position with a single turn of soft iron wire. Expose the grommet to outdoor but shield it from rain and direct sunlight.

NOTE — For grommets of the smallest sizes, it may be difficult to carry out this test in the manner prescribed. In such cases the grommets may be compressed between the edges of metal plates which shall preferably be of varnished aluminium.

A-2.2 Result — If no signs of cracking are visible to the naked eye after seven days, the grommets may be considered to be reasonably resistant to exposure.

APPENDIX B

(*Clause* 7.1)

SAMPLING AND CRITERIA FOR CONFORMITY

B-1. SCALE OF SAMPLING

B-1.1 Lot — In a consignment all the grommets of the same type, dimension, design and manufactured from the same type of rubber under essentially similar conditions of production shall be grouped together to constitute a lot.

B-1.2 Samples shall be selected and tested from each lot separately for ascertaining its conformity or otherwise to the requirements of this specification.

B-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

B-2.1 The number of grommets to be selected at random from a lot for different tests shall depend upon the size of the lot and shall be in accordance with col 1 and 2 of Table 4.

TABLE 4 SCALE OF SAMPLING AND PERMISSIBLE NUMBER OF DEFECTIVES

No. of Grommets in the Lot	For Dimensions, Concentricity, Shape and Finish		For Hardness, Tensile Strength, Elongation and Tension Set	No. of Samples for Tests After Ageing
	Sample Size	Permissible No. of Defectives	No. of Samples for each Characteristic	
(1)	(2)	(3)	(4)	(5)
Up to 100	5	0	3	1
101 „ 150	8	0		
151 „ 300	13	0		
301 „ 500	20	0	5	2
501 „ 1000	32	1		
1 001 and above	50	2	8	3

B-2.1.1 The grommets to be selected from the lot shall be chosen at random with the help of random tables*. In case random number tables are not available, the grommets may be selected from the lot in the following manner:

Starting from any grommet in the lot, they may be counted as 1, 2, 3,..... r, and so on in one order, where r is the integral part of N/n (N and n being the lot size and sample size respectively). Every rth grommet thus counted shall be withdrawn to constitute the sample of size n.

B-2.1.2 If the grommets are packed in bundles, at least 10 percent of the bundles shall be opened and the required number of grommets shall be selected by taking approximately equal number of grommets at random from each of the bundle.

*See IS : 4905-1968 Methods for random sampling.

B-2.2 All the grommets selected according to **B-2.1** shall be examined for dimension, concentricity, shape and finishing defects. Any grommet failing in one or more of the above characteristics shall be considered as defective. If the number of defectives found in the sample is less than or equal to the corresponding permissible number given in col 3 of Table 4, the lot shall be declared as conforming to the requirements.

B-2.2.1 In the case of those lots found unstatisfactory according to **B-2.2**, all the grommets may be inspected depending upon the agreement between the purchaser and the supplier and the defective ones may be removed.

B-2.3 The lot having been found satisfactory according to **B-2.2** shall then be examined for hardness, tensile strength, elongation and tension characteristics. The number of tests to be conducted for each of these characteristics is given in col 4 of Table 4. For this purpose required number of grommets shall be selected at random from those already selected under **B-2.1** and if necessary from the lot. For each of these characteristics the various tests shall be conducted on independent test pieces. The lot shall be declared as satisfactory if none of the samples fails.

B-2.4 The lots, which have been found satisfactory according to **B-2.3** shall then be subjected to test after ageing (*see* Table 3). The number of independent tests to be conducted for each of the characteristics is given in col 5 of Table 4. For this purpose required number of grommets shall be selected from those which have been tested and found satisfactory under **B-2.3**. The lot shall be declared satisfactory with respect to ageing characteristic if none of the samples fails.

B-2.5 If required by the purchaser, one set of tests shall be carried out to determine the conformity of the lot with respect to silver staining, swelling and exposure cracking.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	Unit	Symbol	Definition
Force	newton	N	1 N = 1 $kg.m/s^2$
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V_s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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11 DEC 198

AMENDMENT NO. 1 NOVEMBER 1987

TO

IS:5270-1969 SPECIFICATION FOR RUBBER GROMMETS FOR GENERAL PURPOSES

(Page 8, clause 8.6) - Substitute the following for the existing clause:

'8.6 Compression Set - Carry out the test in accordance with the method prescribed in IS:3400(Part 10)-1977 at constant strain at 70° ± 1°C for 24 $\pm \frac{0}{2}$ hours.'

(PCDC 13) Reprography Unit, BIS, New Delhi, India